HydroBox

POWERING UP AFRICA THROUGH A RENEWABLE ENERGY REVOLUTION

EmPOWERing
1 million people
by 2027

1. WHO WE ARE

What we do

Our mission is to provide **reliable, affordable, sustainable power** in regions that do not have this today to enable progress & prosperity

We develop power projects that generate positive **environmental, social & economic returns**

Our goal is to provide power to **1 million people** in Kenya by 2027

What sets us apart

We use ever flowing rivers which makes our power the most **reliable** & **affordable**

We combine **A**nchor + **B**usiness + household **C**ustomers to spread our risks and to ensure that all power is consumed

We offer a **total solution**: product manufacturing + project development + operation & maintenance

We are **deeply embedded in the local community** and create extra impact through customized services & local partnerships

1. WHO WE ARE

About the product

The Hydrobox is a hydro power station in a box

Main features

Standardised & Containerised

- Reduced costs
- Shorter lead time
- Mobility

Smart sensors & Remote management

- Monitoring and forecasting
- Remote operations

Small & Run-of-river

- Less red tape
- No need for dams
- Low environmental impact

Advantages

- More efficient than solar & wind; more scalable than individual household systems
- Easier to realise than large & complex infrastructure projects
- Quick payback period (4-8y) & long life expectancy (30y)

2. WHAT HAVE WE DONE SO FAR

Power plants	Power	Individuals (em)powered	CO2 emissions avoided
3 online 3 under construction	600kW producing 1.7 mW constructing	18.104	2 million tons

Recent awards & recognitions

EDF Pulse Africa 2019
Most innovative off-grid model

Euronext Brussels
Jungle Bells 2019
Most Innovative Company

Solar Impulse Foundation
Profitable Solution
for the Environment

Start Up Energy Transition 2020
Top 100 Start Up


533 kW Gitugu Power Station, funded by the Crowd

3. OUR TEAM

Founders

John Magiro – Technical director

John grew up in a small village in Murang'a Kenya, about 3 hours drive from the capital Nairobi. Growing up, no one in his community had electricity. The nearest electricity pole was 15 km away.

After seeing his mother struggle, he decided to build his first micro hydro power plant using everyday objects. His talent was quickly noticed, allowing him to scale up and professionalize the technology, constructing a dam that channels water to a turbine and generates electricity.

John is the winner of the Switch Africa Green – Seed Award 2016, the East Africa Hub Grant 2017, WWF Africa Youth Awards 2017, EDF Pulse Africa award (2019) and Business Daily Top 40 under 40 award (2020).

Thomas Poelmans – Managing director

Starting his career as a management consultant at Deloitte, Thomas' first entrepreneurial experience was developing a new service line supporting international organizations manage their operations in Africa.

In 2012, he was one of the people behind the launch of WorldLoop. As project director, Thomas supported the start-up of 15 recycling companies across Africa. In 2015 he started working as a consultant & project developer in recycling & renewable energy projects for several governments, development organisations and private companies. In 2018 he founded Hydrobox.

Thomas holds a Prince II certification in project management and is a World Bank trained M&E expert. His work received various awards, including the Belgian Business Awards for the Environment (2013), the Sustainable partnership award (2014), the Business without borders first prize (2015), EDF Pulse Africa award (2019), Solar Impulse Foundation(2020) and the SET100 award (2020).

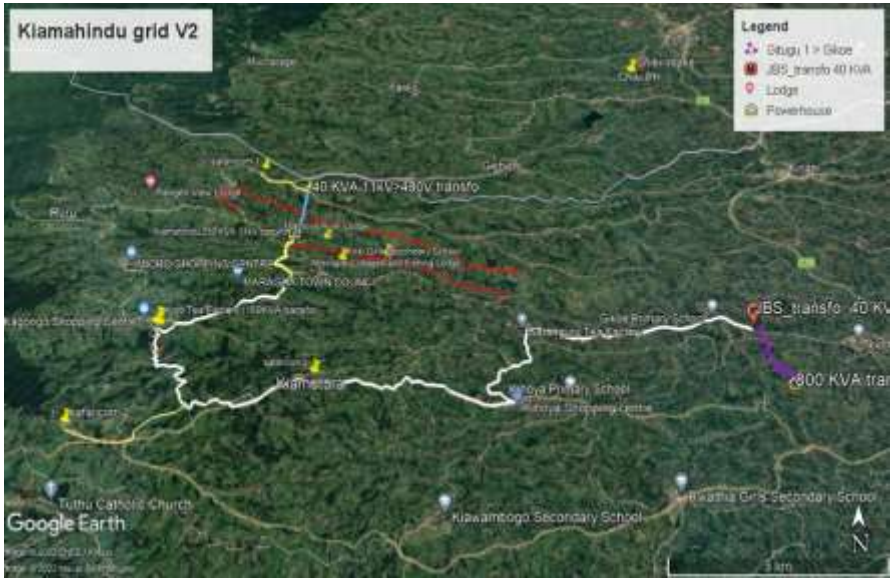
4. LOCATION

The projects take place in Kenya.

- **Kiamahindu power station -** located in Murang'a County, 125 km north of the capital Nairobi. The station will be located on the North Mathioya River and will have a capacity of **110 kW**.

- **Gitwamba Power station** - situated on the Rwamuthambi River and will have a capacity of **170 kW.** The station will provide power to Baricho town, Kirinyaga County, which is located 125 km north of Nairobi.

In both areas, communities suffer from poor to no electricity connection. Over 40 percent of the rural population in Kenya do not have access to electricity.



4. LOCATION

Project sites:

Kiamahindu power station

Gitwamba Power station (formerly known as “Mwangaza”)

4. LOCATION

Kiamahindu: from intake to powerhouse location

4. LOCATION

Gitwamba: from intake to powerhouse location






5. TECHNICAL DESIGN

Gitwamba: main product features

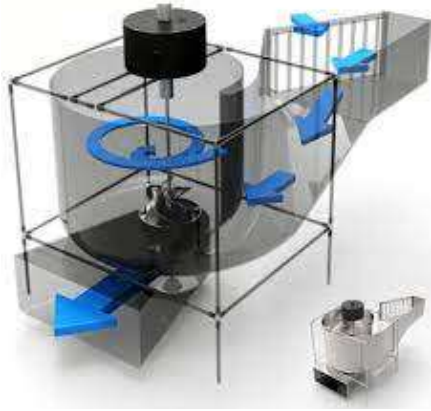
Reliable

- Mitigates effects of climate change on electricity production = extra solar capacity in dry season and extra hydro capacity in wet season
- Consistent 170 kW output, annual yield of 969,564 kWh

Smart

- Automatic water level control: hydraulic control of the turbines' valves and the
- hydraulic power units based on current water level
- Automatic control system with 12" touch screen for on-site control of the powerplant, voltage regulation & synchronization to the grid
- Remote control capability: start & stop the installation, open & close turbine valves, switch operating mode (manual/auto)
- Remote monitoring capability: water levels, temperatures, turbine speed
- turbine valve position, electrical output parameters
- Daily reports & alarms functionality

5. TECHNICAL DESIGN



Kiamahindu: main product features

Reliable
- Capacity (110 kW), yearly energy production of 890.000 kWh
- Guaranteed turbine efficiency of +97%

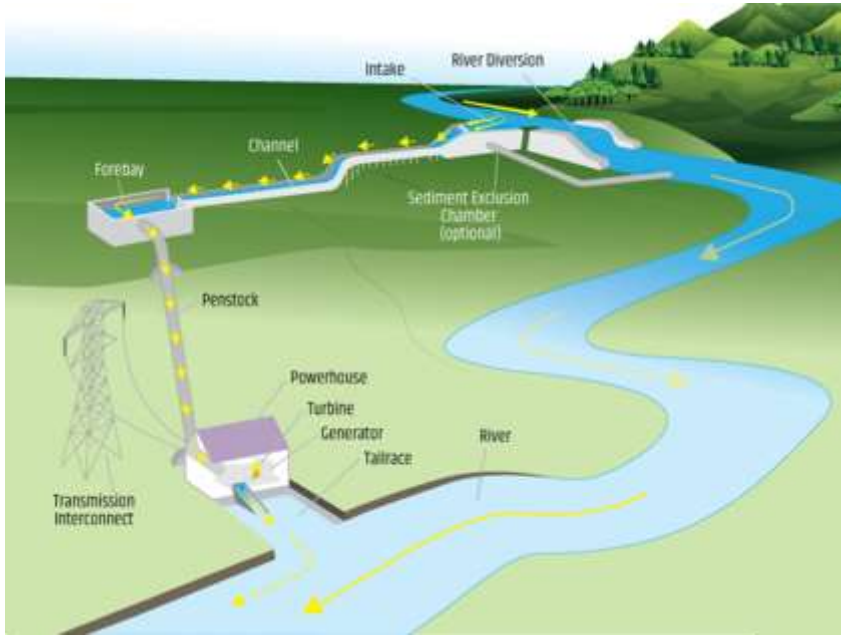
Standardized
- Pre-fabricated, fully equipped Turbulent power plant
- Cluster of 3 turbines of 37kW each, generating together 110kW of power

Smart
- Remote control for predictive maintenance and upgrades
- Automated sluice gate for flow control
- Turbine that generates power from rivers with a low head
- Premium efficiency generator and gearbox for 24/7 operation
- Fish friendly vortex: shape turns incoming flow into a low-pressure vortex, allowing aquatic life to pass unharmed.

5. TECHNICAL DESIGN

Sound design & continuous monitoring of environmental impact

- A detailed **environmental & social impact assessment** is carried out at the start and approved during the licensing of the project.
- The **run-of-the-river design** ensures that the natural flow of the river is not influenced through the construction of a dam which can be intrusive to the environment.
- Only a **portion of the river** is sectioned off for power generation (ensuring environmental flow) and rejoins the river a few hundred meters later (**no water abstraction**).
- A **fine-meshed rack** avoids that fish are not able to enter the intake and get caught in the turbine. In the case of Kiamahindu, we are using a low-pressure vortex, allowing aquatic life to pass unharmed.
- An internal environmental & social impact **monitoring system** is in place and is based on global IFC Performance Standards.
- The project is subject to a yearly **environmental audit** by the Ministry of Environment.



6. PERMITS AND LICENSES

Acquired permissions, permits & licenses

✓ **Lease agreements for the required land**
(from intake to powerhouse)

✓ **No objection letter from the Ministry of Energy (MoE)**
for the development of the project and construction of the mini-grid

✓ **Environmental Impact Assessment License**
from the National Environment Management Authority (NEMA)
based on EIA report, feasibility study and technical designs

Approval from the Water Resource Authority (WRA) (underway)
to construct the proposed works and deviate water from the river

Approval from the County governments (underway)
for the distribution of electricity from the both Power Plants

7. PROJECT IMPACT

Social and enviromental impact

Connections: 16 schools, 4 hospitals and 12 businesses 300 households (1500) end-users will benefit from affordable, reliable and sustainable electricity

- Lower costs of electricity & a sustainable alternative

(no more reliance on diesel gensets)

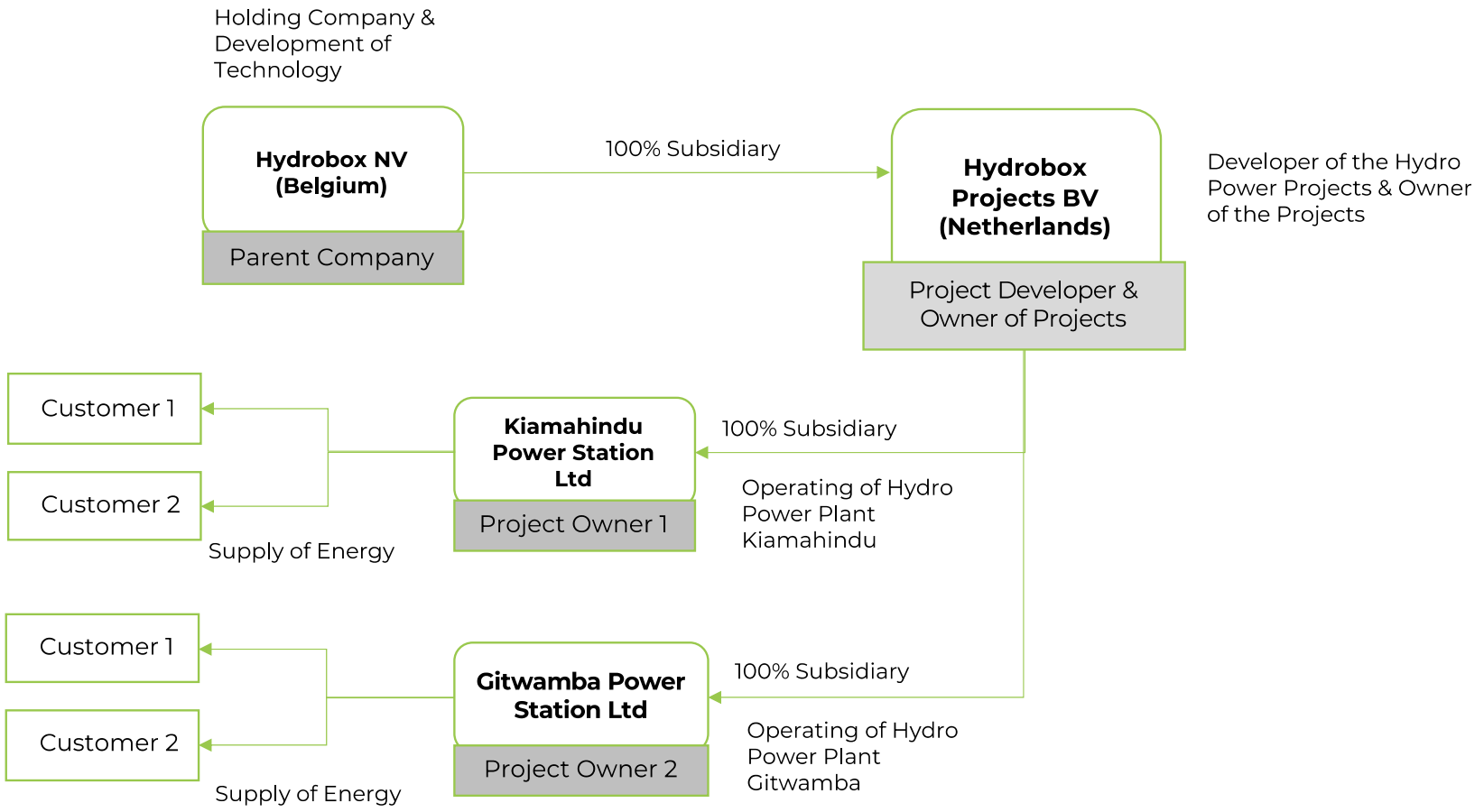
- Increased business productivity as a result of near 100% uptime
- (no more power cuts which are common with the national grid)
- Local power production for local power consumption

Reduction of approximately 1100 tonnes of CO2 per year

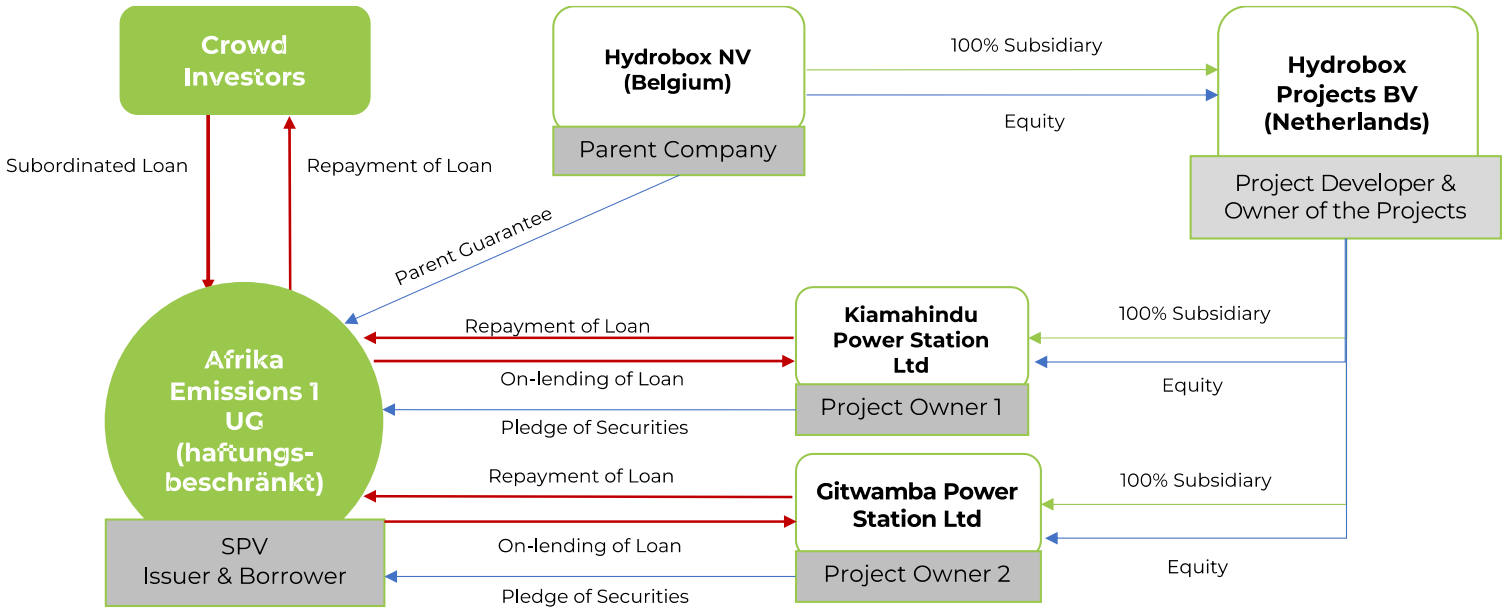
- due to near zero emission per kwh produced

10 new jobs created to manage the power plants & related mini-grid
+ an estimated **40 indirect jobs** as a result of increased performance of our customers due to stable electricity and lower costs for electricity.

8. PROJECT SET UP



9. FINANCING STRUCTURE



Ownership

Payment flows between Crowd, SPV and Projekt Owners

Securities

10. ORGANISATIONS INVOLVED

- Gitwamba Power Station Limited: Issuer, Borrower and Project Company.
- Kiamahindu Power Station Limited: Issuer, Borrower and Project Company.
- Hydrobox Projects BV: project developer and shareholder of Gitugu Power Station Limited (equity provider)
- Hydrobox NV: Holding company and technology provider
- Vlaamse Overheid: Cooperating partner and grant provider

10. Business case

Cashflow Plan									
zusammengefasste Version (für das Gesamtprojekt Kiamahindu und Gitwamba)									
	Start-Up Year 0	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**
Einnahmen		150 422,14 €	250 703,56 €	250 703,56 €	250 703,56 €	250 703,56 €	250 703,56 €	250 703,56 €	250 703,56 €
EBITDA		115 601,11 €	211 972,60 €	211 972,60 €	211 740,57 €	211 485,79 €	211 207,12 €	210 903,37 €	210 573,27 €
Steuern		- 6 821,52 €	- 6 206,01 €	- 5 550,48 €	- 4 852,35 €	- 4 108,85 €	- 3 317,01 €	- 2 473,71 €	- 1 575,59 €
Cashflow aus der Geschäftstätigkeit		**108 779,59 €**	**205 766,59 €**	**206 422,11 €**	**206 888,21 €**	**207 376,94 €**	**207 890,11 €**	**208 429,66 €**	**208 997,69 €**
Mittelzufluss aus Finanzierung	**1 808 000,00 €**	**- €**	**- €**	**- €**	**- €**	**- €**	**- €**	**- €**	**- 19€**
Grant	255 000,00 €	- €	- €	- €	- €	- €	- €	- €	- €
Eigenkapital	500 000,00 €	- €	- €	- €	- €	- €	- €	- €	- €
Fremdkapital (Crowd Darlehen)	1 078 000,00 €	- €	- €	- €	- €	- €	- €	- €	- €
Liquiditätspuffer	- 25 000,00 €								
Abgehende Barmittel aus Finanzierung	**- 1 771 469,00 €**	**- €**	**- €**	**- €**	**- €**	**- €**	**- €**	**- €**	**- €**
Projektkosten	**- 1 677 144,00**								
Reserven	- 70 860,00 €								
Kosten für Wasserkraft- & Solarkomponenten	- 892 000,00 €	- €	- €	- €	- €	- €	- €	- €	- €
Projektentwicklung & Bauarbeiten	- 688 040,00 €								
Crowdfunding Gebühr	**- 94 325,00 €**								
Finanzierungskosten & Tilgung	- €	- 194 827,81 €	- 194 827,81 €	- 194 827,81 €	- 194 827,81 €	- 194 827,81 €	- 194 827,81 €	- 194 827,81 €	- 194 827,81 €
Cashflow Finanzierung	**36 531,00 €**	**- 194 827,81 €**	**- 194 827,81 €**	**- 194 827,81 €**	**- 194 827,81 €**	**- 194 827,81 €**	**- 194 827,81 €**	**- 194 827,81 €**	**- 194 827,81 €**
Jährlicher Cashflow	**36 531,00 €**	**- 86 048,21 €**	**10 938,79 €**	**11 594,31 €**	**12 060,41 €**	**12 549,14 €**	**13 062,30 €**	**13 601,85 €**	**14 169,88 €**
Akkumulierter Cashflow	**36 531,00 €**	**- 49 517,21 €**	**- 38 578,42 €**	**- 26 984,12 €**	**- 14 923,71 €**	**- 2 374,57 €**	**10 687,73 €**	**24 289,58 €**	**38 459,47 €**

OUR TEAM

Join our ambition to emPOWER 1 million people by 2027 !

For more info, reach out to info@hydrobox.africa